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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
08/765,046	11/15/96	TABATA T	8279.146USWO

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EXAMINER	
VANOY, T	

ART UNIT	PAPER NUMBER
1754	15

DATE MAILED: 01/27/99

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary

Application No.	Applicant(s)
08-765,046	TABATA ET AL.
Examiner	**Group Art Unit**
VANOY	1754

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE THREE — MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication .
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

☒ Responsive to communication(s) filed on 18 DEC 98; 03 AUG 98; 06 JULY 98 & 16 JUNE 98.

☒ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 1 1; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) 2-8, 10-12 AND 15-18 is/are pending in the application.

Of the above claim(s)____ is/are withdrawn from consideration.

☒ Claim(s) 6-8 is/are allowed.

☒ Claim(s) 2-5, 10-12 AND 15-18 is/are rejected.

☐ Claim(s)____ is/are objected to.

☐ Claim(s)____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The proposed drawing correction, filed on____ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on____ is/are objected to by the Examiner.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 11 9(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number)____.

☐ received in this national stage application from the International Bureau (PCT Rule 1 7.2(a)).

*Certified copies not received:____.

Attachment(s)

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 10, 11 & 12

☐ Interview Summary, PTO-413

☐ Notice of Reference(s) Cited, PTO-892

☐ Notice of Informal Patent Application, PTO-152

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Other____

Office Action Summary

DETAILED ACTION

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless --
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 3, 4, 15, 16 and 17 are again rejected under 35 U.S.C. 102(b) as being anticipated by Japan patent document no. 5-220,403 A.

The English abstract of the Japan patent document no. 5-220,403 A discloses both a catalyst and method for removing nitrogen oxides out of an oxygen-rich exhaust gas by contacting the nitrogen oxides contaminated exhaust gas with a beta zeolite that may be loaded with cobalt, as set forth in applicants' claims 15 and 16 as well as applicants' claims 3 and 4. From the disclosure set forth on pg. 3, col. 4 paragraph no. [0027] in the text of Japan patent document no. 5-220,403 A it appears that C_3H_6 is the hydrocarbon that acts as a reducing agent for the nitrogen oxides, in a manner that fairly anticipates the use of hydrocarbons having two or larger number of carbons for reducing the NOx as set forth in applicants' claim 16 (particularly since pg. 13 lines 14-16 in the applicants' specification sets forth that the hydrocarbons used in the present invention refer to a wide variety of hydrocarbons, including olefins).

The limitations set forth in applicants' claims 15 and 16 calling for the metallosilicate to have a plurality of straight channels of oxygen 8-ring or larger in section, said plurality of straight

channels being oriented in at least two different dimensional directions, individual members of said plurality of straight channels communicating with each other via micropores having a size of oxygen 8-ring or larger, the straight channels oriented in at least one of said at least two different dimensional directions having a size in section of oxygen 10-ring or larger are noted, but no material distinction is seen in as much as the catalyst that the applicants use appears to be the same cobalt containing beta zeolite described in the English abstract of the Japan patent document no. 5-220,403 A (please compare the cobalt containing beta zeolite described in Examples 1, 2 and 4 in the applicants' specification to the cobalt containing beta zeolite taught in the English abstract of the Japan patent document no. 5-220,403 A as well as note the disclosure set forth on pg. 6 lines 6-9 in the applicants' specification teaching that the applicants' most preferred form is BEA (i. e. beta) which has straight channels of oxygen 12-ring section in two different dimensional directions, the channels communicating with each other via 12-ring micropores).

Additionally, note that paragraph [0027] on pg. 3 in the Japan patent document no. 5-220,403 A discloses that the exhaust gas contains C_3H_6 (but does not mention the presence of any other hydrocarbons), thus, in the process of Japan patent document no. 5-220,403, 90 percent or more of the hydrocarbons contained in the exhaust gas are hydrocarbons having four or fewer carbons, as set forth in applicants' claim 17.

Claims 3, 15 and 16 are again rejected under 35 U.S.C. 102(b) as being anticipated by U. K. patent application 2 238 784 A to Tamura et al.

The Tamura et al. application discloses both a catalyst and a process for removing nitrogen oxides out of an exhaust gas containing excess oxygen (please see pg. 2 lines 14-17 in this Tamura et al. application) by contacting the nitrogen oxides contaminated exhaust gas with a zeolite that may be of the ferrierite type that carries cobalt (please see Table 2 on pg. 10, particularly the cobalt "Metallic element supported" and "Kind of carrier" B (the ferrierite) in this Tamura et al. application), wherein the contact between the nitrogen oxide contaminated exhaust gas and the Co/zeolite is conducted in the presence of organic compounds (such as methane, ethane, propane, etc...) which act as reducing agents for the nitrogen oxides (please see the paragraph bridging pages 4 and 5 in this Tamura et al. application), as set forth in applicants' claims 3, 15 and 16.

The limitations set forth in applicants' claims 15 and 16 calling for the metallosilicate to have a plurality of straight channels of oxygen 8-ring or larger in section, said plurality of straight channels being oriented in at least two different dimensional directions, individual members of said plurality of straight channels communicating with each other via micropores having a size of oxygen 8-ring or larger, the straight channels oriented in at least one of said at least two different dimensional directions having a size in section of oxygen 10-ring or larger are noted, but no material distinction is seen in as much as the catalyst that the applicants use appears to be the same cobalt containing ferrierite zeolite described Table 2 on pg. 10 in the Tamura et al. application (please compare the cobalt containing ferrierite zeolite described in the second full paragraph on pg. 4 and the paragraph bridging pages 5 and 6 in the applicants' specification (note

that "FER" refers to ferrierite) to the cobalt containing ferrierite zeolite taught in Table 2 on pg. 10 in the Tamura et al. application).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 148 USPQ 459, that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or unobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was

made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

The person having "ordinary skill in the art" has the capability of understanding the scientific and engineering principles applicable to the claimed invention. The references of record in this application reasonably reflect this level of skill.

Claims 2-5, 10 and 15-17 are again rejected under 35 U.S.C. 103(a) as being unpatentable over Japan patent document no. 5-220,403 A.

The English abstract of the Japan patent document no. 5-220,403 A discloses both a catalyst and method for removing nitrogen oxides out of an oxygen-rich exhaust gas by contacting the nitrogen oxides contaminated exhaust gas with a beta zeolite that may be loaded with cobalt, as set forth in applicants' claims 15 and 16 as well as applicants' claims 3, 4 and 10. From the disclosure set forth on pg. 3, col. 4 paragraph no. [0027] in Japan patent document no. 5-220,403 A it appears that C_3H_6 is the hydrocarbon that acts as a reducing agent for the nitrogen oxides, in a manner that fairly anticipates the use of hydrocarbons having two or larger number of carbons for reducing the NOx as set forth in applicants' claim 16 (particularly since pg. 13 lines 14-16 in the applicants' specification sets forth that the hydrocarbons used in the present invention refer to a wide variety of hydrocarbons, including olefins).

The limitations set forth in applicants' claims 15 and 16 calling for the metallosilicate to have a plurality of straight channels of oxygen 8-ring or larger in section, said plurality of straight channels being oriented in at least two different dimensional directions, individual members of said

plurality of straight channels communicating with each other via micropores having a size of oxygen 8-ring or larger, the straight channels oriented in at least one of said at least two different dimensional directions having a size in section of oxygen 10-ring or larger are noted, but no material distinction is seen in as much as the catalyst that the applicants use appears to be the same cobalt containing beta zeolite described in the English abstract of the Japan patent document no. 5-220,403 A (please compare the cobalt containing beta zeolite described in Examples 1, 2 and 4 in the applicants' specification to the cobalt containing beta zeolite taught in the English abstract of the Japan patent document no. 5-220,403 A as well as note the disclosure set forth on pg. 6 lines 6-9 in the applicants' specification teaching that the applicants' most preferred form is BEA (i. e. beta) which has straight channels of oxygen 12-ring section in two different dimensional directions, the channels communicating with each other via 12-ring micropores).

Additionally, note that paragraph [0027] on pg. 3 in the Japan patent document no. 5-220,403 A discloses that the exhaust gas contains C_3H_6 (but does not mention the presence of any other hydrocarbons), thus, in the process of Japan patent document no. 5-220,403 A, 90 percent or more of the hydrocarbons contained in the exhaust gas are hydrocarbons having four or fewer carbons, as set forth in applicants' claim 17.

The difference between the applicants' claims and this Japan patent document no. 5-220,403 A is that applicants' claim 2 calls for the metallosilicate to have an average diameter for the primary particles of 0.01 and 0.2 micrometers whereas Japan patent document no. 5-220,403 A does not appear to expressly describe the particle size of the primary particles, however it is

submitted that this difference would have been obvious to one of ordinary skill in the art at the time the invention was made because it is expected to be within the skill level of the person having ordinary skill in the art to readily determine the size of the particles and there is no evidence of record establishing that the size of the primary particles of the applicants' catalyst and the catalyst of the Japan patent document no. 5-220,403 A do, in fact, differ.

Note that the bottom portion of paragraph [0024] in the Japan patent document no. 5-220,403 A discloses a Si/Al ratio of 20 in a manner that is not seen to distinguish from the Si/Al ratios recited in applicants' claims 5 and 10.

The difference between the applicants' claims and the Japan patent document no. 5-220,403 A is that applicants' claims 5 and 10 set forth a Co/Al ratio of 0.2 to 0.6 whereas Japan patent document no. 5-220,403 A does not appear to expressly recite what the Co (or other catalytic metals)/Al ratio is, however it is submitted that this difference would have been obvious to one of ordinary skill in the art at the time the invention was made because it is expected to be within the skill level of the person having ordinary skill in the art to readily determine the Co/Al ratio in the catalyst of Japan patent document no. 5-220,403 A and there is no evidence of record establishing that the Co/Al ratio of the applicants' catalyst and the catalyst of the Japan patent document no. 5-220,403 A do, in fact, differ.

Claims 3, 15 and 16 are again rejected under 35 U.S.C. 103(a) as being unpatentable over U. K. patent application 2 238 784 A to Tamura et al.

The Tamura et al. application discloses both a catalyst and a process for removing nitrogen oxides out of an exhaust gas containing excess oxygen (please see pg. 2 lines 14-17 in this Tamura et al. application) by contacting the nitrogen oxides contaminated exhaust gas with a zeolite that may be of the ferrierite type that carries cobalt (please see Table 2 on pg. 10, particularly the cobalt "Metallic element supported" and "Kind of carrier" B (the ferrierite) in this Tamura et al. application), wherein the contact between the nitrogen oxide contaminated exhaust gas and the Co/zeolite is conducted in the presence of organic compounds (such as methane, ethane, propane, etc...) which act as reducing agents for the nitrogen oxides (please see the paragraph bridging pages 4 and 5 in this Tamura et al. application), as set forth in applicants' claims 3, 15 and 16.

The limitations set forth in applicants' claims 15 and 16 calling for the metallosilicate to have a plurality of straight channels of oxygen 8-ring or larger in section, said plurality of straight channels being oriented in at least two different dimensional directions, individual members of said plurality of straight channels communicating with each other via micropores having a size of oxygen 8-ring or larger, the straight channels oriented in at least one of said at least two different dimensional directions having a size in section of oxygen 10-ring or larger are noted, but no material distinction is seen in as much as the catalyst that the applicants use appears to be the same cobalt containing ferrierite zeolite described Table 2 on pg. 10 in the Tamura et al. application (please compare the cobalt containing ferrierite zeolite described in the second full paragraph on pg. 4 and the paragraph bridging pages 5 and 6 in the applicants' specification (note

that "FER" refers to ferrierite) to the cobalt containing ferrierite zeolite taught in Table 2 on pg. 10 in the Tamura et al. application).

The difference between the applicants' claims and this Tamura et al. application is that applicants' claims 15 and 16 call for the metallosilicate to have a plurality of straight channels of oxygen 8-ring or larger in section, said plurality of straight channels being oriented in at least two different dimensional directions, etc..., however it is submitted that this difference would have been obvious to one of ordinary skill in the art at the time the invention was made because a review of the applicants' specification on pages 4-6 and Table 2 on pg. 10 in the Tamura et al. application reveals that both the applicants' and Tamura et al. are using the same catalyst. Therefore, the descriptive limitations set forth in applicants' claims 15 and 16 are not seen to impart a material difference between the catalysts.

Claims 6, 7, 8, 11, 12 and 18 have not been rejected under either 35 U.S.C. 102 or 35 U.S.C. 103 because there is no suggestion or teaching in the references of record to modify the zeolite catalysts of either Japan patent document no. 5-220,403 A or U. K. patent application no. 2 238 784 A to include either or both of the boron and titanium set forth in applicants' claims 6, 7, 8, 11, 12 and 18.

Response to Arguments

Applicant's arguments filed 18 December 1998 as paper no. 14 have been fully considered but they are not persuasive.

a) The applicants argue that the sole metal used in the examples in JP 5 220 403 A is copper, whereas the applicants' invention is directed to the use of cobalt in the catalyst.

Evidently, cobalt was considered to be among the metals that can be chosen to be supported on a support that may be beta zeolite (please see the English abstract and paragraph no. 13 on pg. 2 in the text of JP 5-220,403 A), in a manner that is not seen to materially distinguish from the applicants' catalyst.

b) The applicants argue that Examples 9 and 11 and figures 1 and 3 in the present application shows superior NOx conversion for cobalt-BEA when compared to Co-MFI.

The discovery of superior and unexpected advantages of the prior art cobalt on beta zeolite composition embraced by the scope of the compositions disclosed in JP 5 220 403 A does not make for either a new or unobvious cobalt supported on beta zeolite catalyst.

c) The applicants argue that the results submitted in the Declaration signed by Mr. Tabata show that copper containing catalysts suffered from significant deterioration upon exposure to water vapor and the nickel containing catalyst was significantly inferior to the copper catalyst.

The disclosure set forth in the Declaration signed by Mr. Tabata has been reviewed and considered, but does render either unknown or unobvious the cobalt on beta zeolite embraced by the scope of compositions disclosed in JP 5 220 403 A.

d) The applicants argue that there is no teaching in JP 5 220 403 A that would lead one of ordinary skill in the art to use cobalt over the other metals listed. If anything, the use of copper in the examples (of JP 5 220 403 A) would suggest that copper be the most useful metal.

The specific selection of known and disclosed prior art catalyst (i. e. cobalt supported on beta zeolite) out of the plurality of catalysts in the disclosure set forth in the English abstract and paragraph no. 13 in the text of JP 5 220 403 A (cobalt supported on beta zeolite; copper supported on beta zeolite; etc. . .) does not make for either a new or previously-undisclosed catalyst.

e) The applicant argues that Tamura et al. (GB 2 238 784 A) discloses NOx reduction using a ferrierite carrying cobalt as a catalyst and propane as a reducing agent. Ferrierite has straight channels of 8 ring and 10 ring having two different dimensional directions. The present claims require the presence of 10 ring channels. Tamura et al. fail to anticipate the present invention.

The argument is incomplete because it is not accompanied with a showing of how the claimed catalyst materially excludes the 8 rings that are argued to be part of the Tamura et al. catalyst, in the manner that the argument suggests.

f) The applicant argues that Tamura et al. fails to teach a cobalt loaded zeolite with particular structure requirements. The reference mentions the possible use of cobalt along with many other metals.

Not only is cobalt loaded zeolite is expressly taught in Table 1 on pg. 10 lines 28-31 in GB 2 238 784 A, but it is there shown to promote the removal of NOx out of a gas - the same catalyst and the same process embraced in the scope of the applicants' claims.

g) The applicant argues that Table 2 on pg. 12 (of GB 2 238 784 A) discloses that cobalt loaded catalysts are less than optimal. Instead, copper loaded catalysts are shown to out perform cobalt. This teaches away from the applicant's invention.

The disclosure set forth in Table 2 on pg. 10 lines 28-31 in GB 2 238 784 A (i. e. the cobalt loaded zeolite promoting the removal of NOx out of a gas) does not teach away from the applicants' invention, but teachs the applicant's invention.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication should be directed to Timothy C. Vanoy at telephone number (703) 308- 2540.

Timothy C. Vanoy/tcv

25 January 1999

GARY P. STRAUB
PRIMARY PATENT EXAMINER
ART UNIT 113